Western Electric

272A Vacuum Tube



Classification—Low-power triode with indirectly heated cathode

Applications

Radio-frequency antenna-coupling amplifier.

Audio-frequency amplifier where small power outputs are required.

Detector or modulator.

Dimensions—Outline diagrams showing dimensions of the tube and base, and the arrangement of the electrode connections to the base terminals are shown in Figures 1 and 2.

Base—Medium, five-pin base with bayonet pin.

Socket—Standard, five-contact type, such as the Western Electric 141A socket.

Mounting Positions—The 272A tube may be mounted in any position.

Average Direct Interelectrode Capacitances

Grid to plate	2.8 $\mu\mu$f.
Grid to heater and cathode	3.4 $\mu\mu$f.
Plate to heater and cathode	2.6 $\mu\mu$f.

Heater Rating

Heater voltage	10.0 volts, a.c. or d.c.
Nominal heater current	0.32 ampere

The heater element of this tube is designed to operate on a voltage basis and should be operated at as near the rated voltage as is practicable.

Cathode Connection—When the heater is operated on alternating current, a reduction of hum in the tube may usually be obtained by connecting the cathode to a center tap on the secondary of the heater transformer or to the center point of a suitable resistance connected across the heater terminals. If voltage must be applied between the heater and cathode, it should be kept as low as possible and should never exceed 90 volts.

Characteristics—Plate current characteristics of a typical 272A tube are shown in Figure 3 as functions of grid voltage for several values of plate voltage. Corresponding amplification factor, plate resistance, and transconductance characteristics are given in Figures 4, 5 and 6, respectively. Plate current characteristics are shown as functions of plate voltage for several values of grid voltage in Figure 7.

Operating Conditions and Output—Permissible operating conditions are included within the area, ABCD, in Figure 3. Amplification factor, plate resistance, transconductance, and performance data are given in the table below for a number of typical operating conditions represented by selected points within this area. The less severe operating conditions should be selected in preference to maximum operating conditions wherever possible. The life of the tube at maximum conditions may be shorter than at less severe conditions.

The performance data include the fundamental power output in milliwatts and the second and third harmonic levels in decibels below the fundamental for values of load resistance, R, both equal to and double the plate resistance, r_p. The peak value of the sinusoidal input, E_{gm}, which gives the indicated power output, P_m, and harmonic levels, F_{2m} and F_{3m}, in each case, is numerically equal to the grid bias. For a smaller input voltage, E_g, the output and harmonic levels, except for the lowest third harmonic levels, are given approximately by the following relations:

$$P = P_m \left(\frac{E_g}{E_{gm}}\right)^2$$

$$F_2 = F_{2m} + 20 \log_{10} \frac{E_{gm}}{E_g}$$

$$F_3 = F_{3m} + 40 \log_{10} \frac{E_{gm}}{E_g}$$

The level of the third harmonic in the 272A tube is usually low and may differ widely in individual tubes. The values given in the table are for a typical tube.

Microphonic Noise—With a plate voltage of 100 volts, a grid bias of −7 volts, and a load resistance of 100,000 ohms, the mean microphonic noise output level of the 272A tube, measured in a laboratory reference test set, is 39 decibels below 1 volt. The range of levels of individual tubes extends from 26 to 52 decibels. Since microphonic noise depends on the type and intensity of the mechanical disturbance which produces it, the values given here are useful chiefly for comparison with the levels of other tubes which have been tested in the same way.

TABLE

Plate Voltage	Grid Bias	Plate Current	Amplification Factor	Plate Resistance	Transconductance	Input Voltage	Load Resistance	Power Output	Second Harmonic	Third Harmonic
Volts	Volts	Milliamperes		Ohms r_p	Micromhos	Peak Volts	R	Milliwatts	db	db
80	−2	8.7	6.6	5400	1220	2	$R = r_p$	3.5	36	65
							$R = 2r_p$	3	39	65
80	−5	5.4	6.1	6600	930	5	$R = r_p$	17	26	60
							$R = 2r_p$	15	28	55
80	−8	2.9	5.6	8600	650	8	$R = r_p$	30	21	65
							$R = 2r_p$	25	24	50
100	−7	6.6	6.0	6300	950	7	$R = r_p$	35	25	55
							$R = 2r_p$	30	28	50
100	−11	3.3	5.5	8800	630	11	$R = r_p$	55	19	55
							$R = 2r_p$	50	23	50
120	−10	6.7	5.8	6400	910	10	$R = r_p$	65	23	55
							$R = 2r_p$	60	26	50
120	−14	3.7	5.5	8600	630	14	$R = r_p$	90	18	50
							$R = 2r_p$	80	22	55
140	−15	5.4	5.6	7400	760	15	$R = r_p$	120	19	50
							$R = 2r_p$	110	23	50
140	−18	3.4	5.3	9400	570	18	$R = r_p$	130	17	42
							$R = 2r_p$	120	21	60
160	−20	4.5	5.4	8400	650	20	$R = r_p$	180	17	43
							$R = 2r_p$	160	21	65
160	−22	3.3	5.3	10000	530	22	$R = r_p$	180	16	40
							$R = 2r_p$	160	20	55
*100	−3	11.2	6.6	5000	1320	3	$R = r_p$	9	34	65
							$R = 2r_p$	8	36	65
*120	−7.5	9.2	6.1	5500	1100	7.5	$R = r_p$	45	26	60
							$R = 2r_p$	40	29	55
*140	−12	8.0	5.8	6100	960	12	$R = r_p$	100	23	60
							$R = 2r_p$	90	26	50
*160	−17	6.6	5.6	6800	820	17	$R = r_p$	170	19	50
							$R = 2r_p$	150	24	55
*180	−21	6.2	5.5	7200	760	21	$R = r_p$	230	18	46
							$R = 2r_p$	210	22	60
*180	−27	2.5	5.1	11700	440	27	$R = r_p$	220	15	38
							$R = 2r_p$	200	19	46

*Maximum operating conditions.

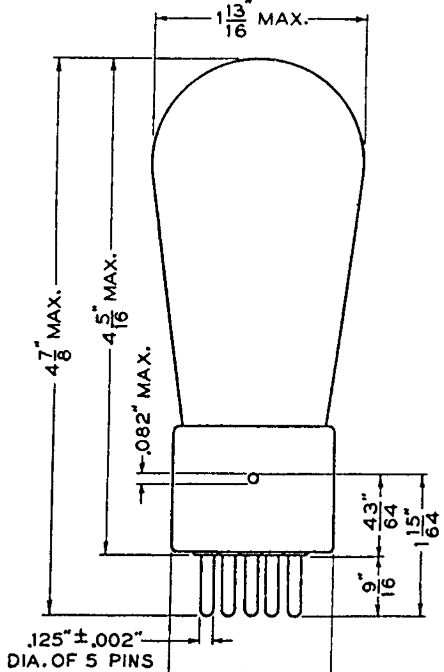


FIG. 1

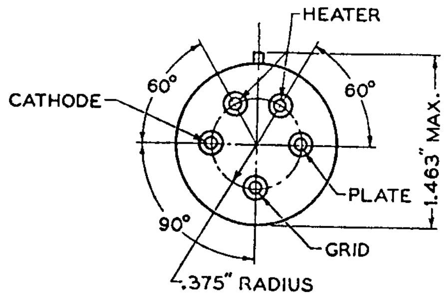


FIG. 2

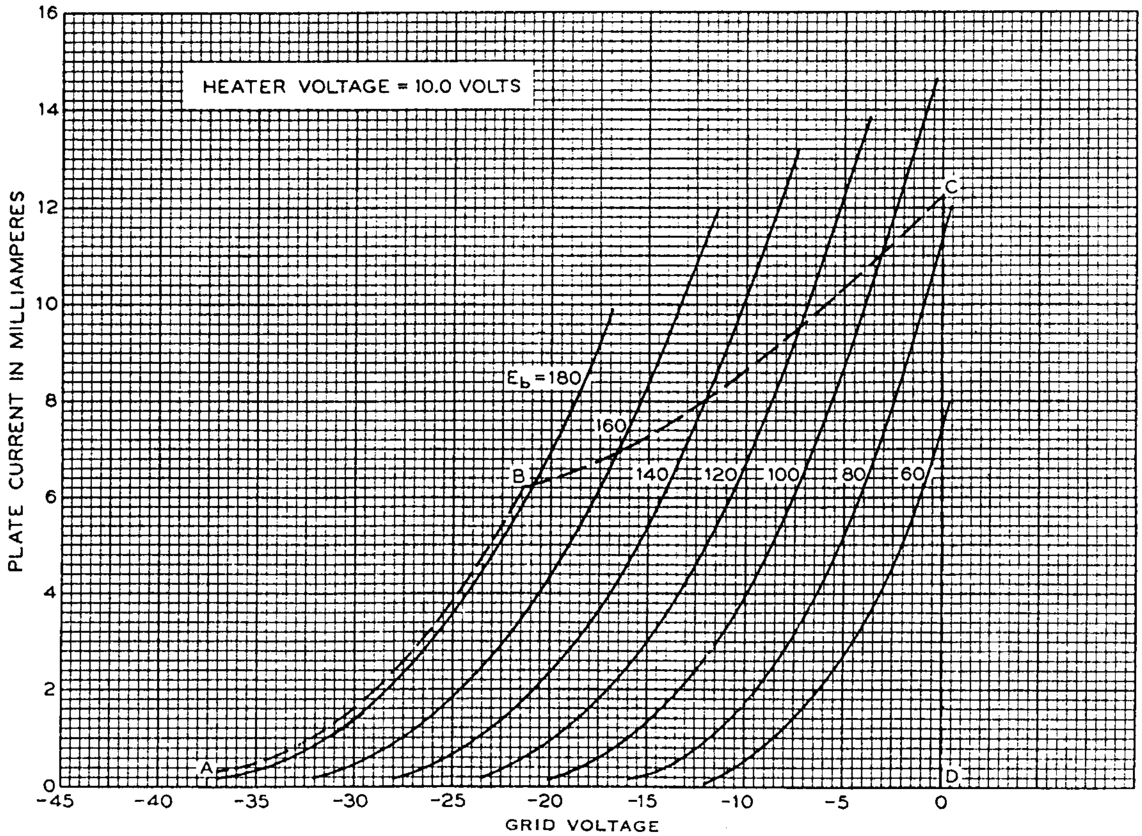


FIG. 3

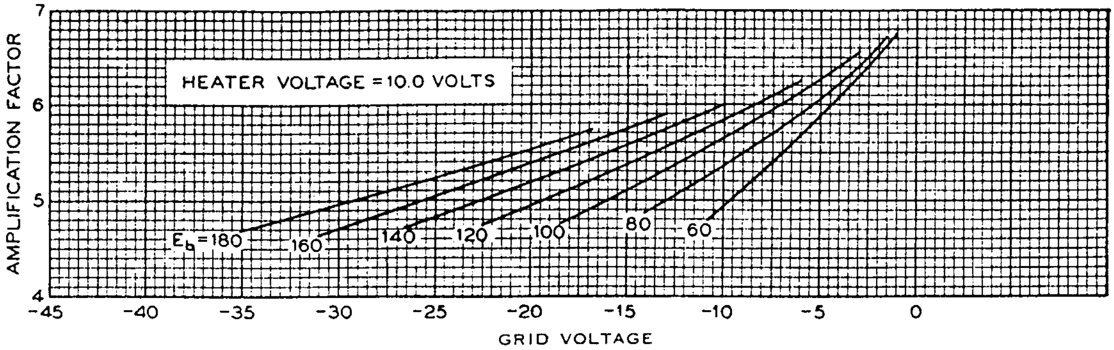


FIG. 4

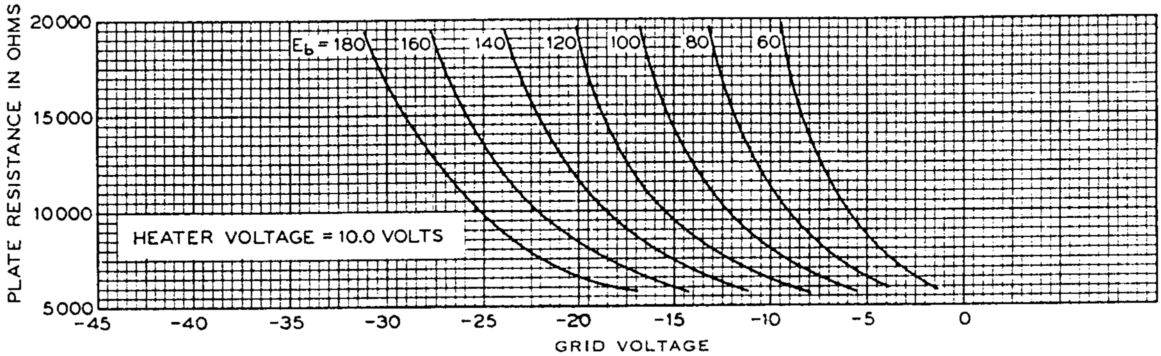


FIG. 5

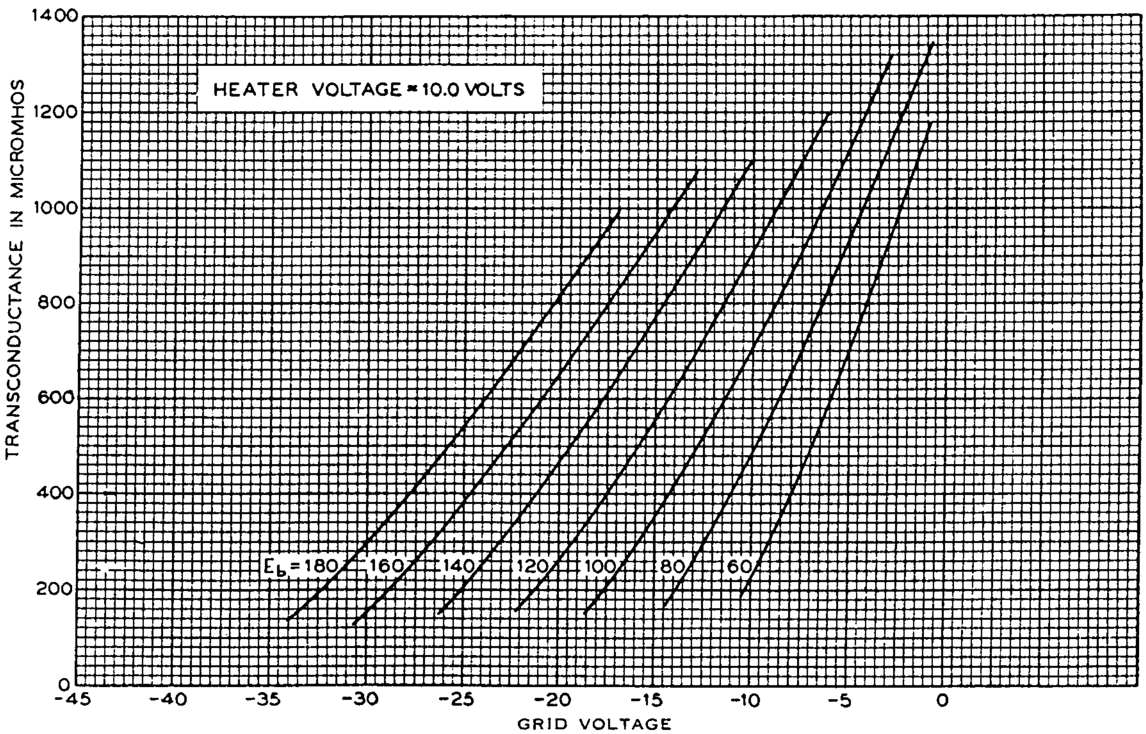


FIG. 6

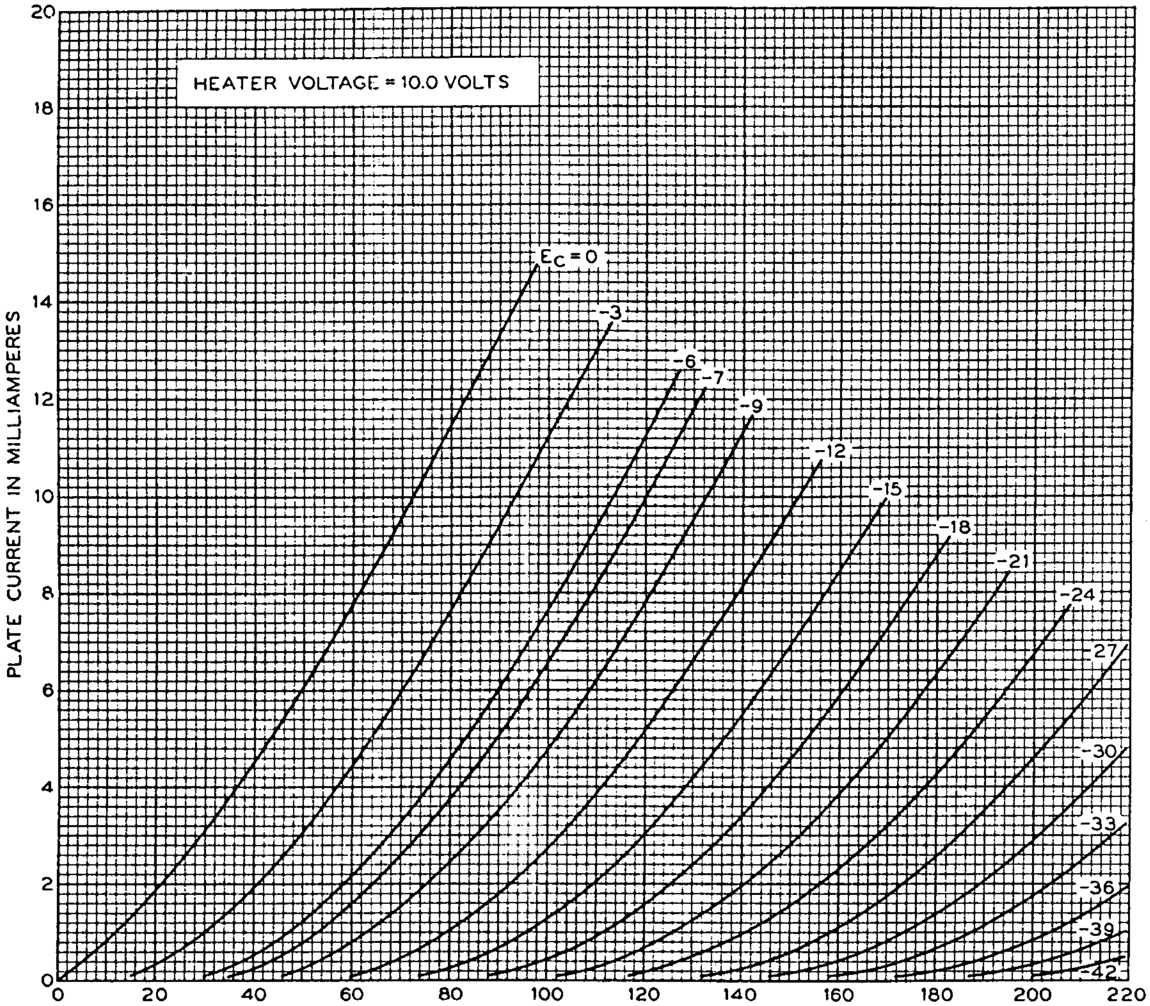

HEATER VOLTAGE = 10.0 VOLTS
PLATE CURRENT IN MILLIAMPERES
PLATE VOLTAGE
EC = 0
-3
-6
-7
-9
-12
-15
-18
-21
-24
-27
-30
-33
-36
-39
-42
0
2
4
6
8
10
12
14
16
18
20
0
20
40
60
80
100
120
140
160
180
200
220

FIG. 7